

THIS ISSUE \$3.00

MID-DECEMBER 1958

# Aviation Week

Including **Space Technology**

A MCGRAW-HILL PUBLICATION



**AIRCRAFT**

**SPACE VEHICLES  
& MISSILES**

**AVIONICS**

**SUPPORT  
EQUIPMENT**

**AIRLINE & AIRPORT  
EQUIPMENT**

**BUYERS' GUIDE ISSUE**











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## Strategic Systems

Defense Systems

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Received 11 March 2004; accepted 12 May 2004

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# BUYERS' GUIDE FOR 1959

Section  
**A**



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CECO pioneered the introduction of precision accurate fuel system components into a "single injector" type of fuel system. Typical of this philosophy is a series of lightweight, compact fuel control for small turbine engines. Some models in this series, even though they incorporate integral fuel nozzles, actually weigh less than eight pounds. For free-piston turbine, CECO produces a series of "valved" fuel control systems, each containing main pump control, power turbine governor, dual spray pump, and an emergency fuel system.



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Both proportional and On-Off type servo control valves are produced at CECO — many versions manufactured in quantities on a subminiature basis. Skilled engineers, aided by the latest machine tool equipment, are known for their ability to hold tolerances between critical mating parts in hydraulic mechanisms to .00004".

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Bell's X-1, which takes off and lands vertically in a conventional horizontal attitude, has demonstrated in actual flight that the minimum take-off requirements of helicopters can be combined successfully with the high-speed performance of jet aircraft. An operational military airplane embodying this Bell-pioneered VTOL concept now is in advanced stages of development under Navy and Air Force contract. Bell engineers foresee the day when the same principle will be applied to both military and commercial jets of all sizes.



#### AVIONICS DIVISION

Among the far-reaching accomplishments of this division is the development of an all-weather Automatic Landing System which brings aircraft in to touchdown without pilot control. After hundreds of successful demonstration landings on both airports and carrier decks, a commercial version of Bell's ALSC recently has successfully landed a post Boeing 747 jet transport at Washington here. The Avionics Division is also among the industry leaders in the development of instrumentation and control systems for missile and aircraft guidance.



#### SPACE FLIGHT & MISSILES DIVISION

The Bell team had the sole weapon system responsibility for the design, development and production of the GAM-65 Royal air-to-surface guided missile for the Strategic Air Command. It is now vigorously engaged in many advanced problems surrounding space flight including development of the Dynaloc hyperbolic glider for the Air Force. This Bell-developed space craft is designed to carry men in orbit around the earth at high speeds and high altitudes for reconnaissance or bombardment.



#### ROCKETS DIVISION

In addition to developing and producing the complete propulsion system for Bell's own Ramjet, this division also has been closely associated with the rocket power problems for many other missile and satellite programs. These skilled teams of scientists and engineers are now possessing the potentials of propellants with even greater energy, and have recently accomplished the first large-scale rocket thrust chamber firing using the ultimate in chemical oxidizers, elemental liquid fluorine.

Bell Aircraft Corporation is a member of the World Bell industry team developing the Titan-Sat System. Key members of the U. S. Air Force Titan team include the Martin Company, Douglas Aircraft Corporation, Westinghouse Electric Corporation, General Electric Company and American Machine and Foundry Company.

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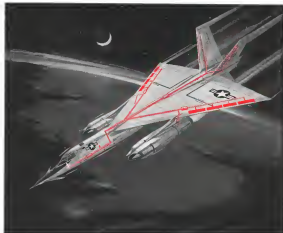
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Section  
**B**

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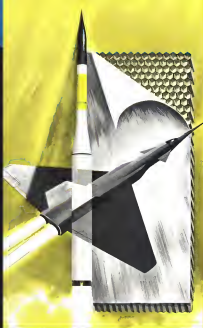
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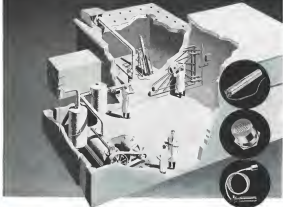
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NEWARK, N.J. (AP)—The New York City Police Department has announced that it has received information that a man who was arrested in connection with the 9/11 attacks is now in custody in New Jersey.



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*Abstract:* Although the current body of evidence

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Some basic mechanical services, right, as a detonation-capable priming/initiator, having a built-in operated safety pin, by the substitution of an explosive charge, launch bolt, or becomes a rocket. Two separate channels for fast reliable, mechanisms so designed that to ensure of safety are revealed with from "arm" to "safe" position. If these would be simple, we can show you some *special* ones.

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A top-down diagram of an aircraft. A vertical line points to the wing root, labeled with the number 1. A horizontal line points to the wing tip, labeled with the number 2.

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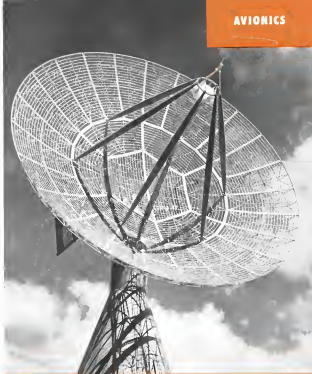
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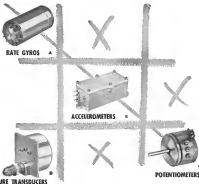
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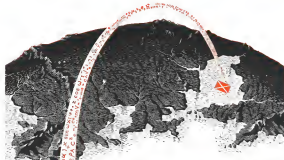
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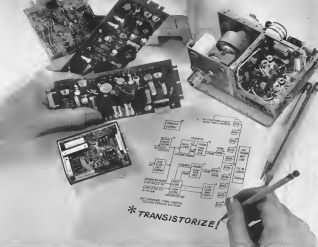


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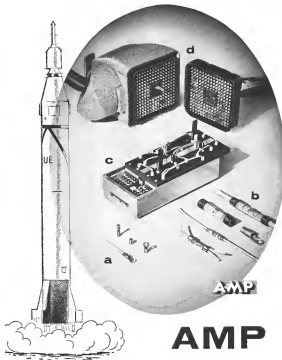
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| Input Impedance: 200K ohms  | X | X |
| Voltage Gain: 3000 ohms   | X | X |
| 300 ohms  | X | X |
| Adjustable by external resistors                                    | X | X |
| Output: 50 I range  | X | X |
| Response Time: 1 cycle of input frequency                           | X | X |
| Drive: d-c; input impedance: Temperature Range: -55°C to +125°C     | X | X |
| 100 ohms  | X | X |
| Input: servo stabilization, of velocity constant of 100             | X | X |
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## CASE HISTORIES

### **Research Labs Keep Pace With Giant Stride Of America's Air Industry!**

#### CUSTOMER PROBLEM:

Require test rig for measuring full scale aircraft turbine bearings. Test rig must simulate actual operating conditions.

#### SOLUTION:

N/D engineering, in cooperation with customer under the direction of a defense agency, developed the aircraft turbine bearing testing equipment shown above. The Unit 112 Control Console, shown on the left, initiates and controls tests, and completely records all operating performance characteristics. The test stand itself, above right, simulates the actual condi-

tions to which the bearings are subjected in flight. It develops radial loads of up to 25,000 lbs., and thrust loads reaching a maximum 75,000 lbs. Bearings up to 110mm bore are tested at speeds as high as 20,000 r.p.m., in temperatures ranging up to 1300° F. Research facilities such as this are your assurance that New Departure stands ready to work closely with you on your bearing research problems.

For information on New Departure precision Aircraft and Instrument ball bearings, or research facilities, call the New Departure Sales Engineer in your area or write Dept. G-12.



DIVISION OF GENERAL MOTORS, BRISTOL, CONN.

ENTRUSTED POWER LINE AND WIRE

From research—development—design—fabrication—installation—field services—to final success

## **SPACE** meets the pace... of today's accelerated ground support needs



Mission accomplished:

**TITAN** erector actuators

**BOMARC** flight simulators

**ATLAS** weight and thrust measuring systems

altitude simulation chambers / permanent semi-portable and mobile test cells / mock house instrumentation / missile liquid level poppet detection systems / valve leakage testers

Name your functional requirements for ground support! Conventional aircraft, turbojets, turboprops, ramjets, missiles or rockets—count on the same **SPACE** skill to speed the solution to your problems.

## **SPACE** FIRE CONTROL UNIT

Now, fire control faster, more effectively, and at lower cost than with any type of conventional equipment known today! Easily portable, fool-proof in operation, and completely dependable, **SPACE** Fire Control delivers accurate volumes of dry chemical plus chemical foam at high pressures, when and wherever needed. **SPACE** Fire Control meets the highest standards set by installations and world safety experts. And if necessary, the **SPACE** unit doubles as a pump with capacity for more than 500 gallons of water a minute.

Available skid, trailer or truck mounted to suit your particular requirements.

### ENGINEERS

Large, good sized units that operate easily with **SPACE** while being able to handle much smaller units. Units with built-in control systems or by remote control. Available in a number of sizes for ground or aerial launch. See G-12, page 27, table.



**SPACE CORP.**  
Aerostatic Propulsion and Control Equipment

SHALON ROAD AND FAIRDALE • GARDEN CITY, TEXAS



**why**  
**HYATT**  
 is America's  
**. NO. 1**  
**SOURCE**  
 of jet engine  
 roller bearings:

HYATT offers two decisive advantages:

1. Years of experience in cooperating with aircraft engineers to develop solutions to jet-engine bearing problems.

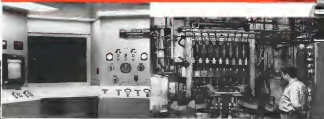
2. The skills and facilities to maintain prototype quality throughout on-time quantity production.

For size ranges and load ratings of standard HYATT Aircraft Bearings, request Catalog A-36. For expert engineering and production help in solving special bearing problems, contact Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.



**THE MEN**  
**AND**  
**DEVELOP**  
**DEPENDABLE**

**...THE FACILITIES**  
**THE MACHINES TO**  
**AND DELIVER MORE**  
**AIRCRAFT BEARINGS!**



**FACILITIES:** This high speed test room, this is part of a completely equipped metallurgical laboratory with modern test equipment, for research and development in the fields of Higher Temperatures • Higher Speeds • Heavier Loads in smaller sizes, to meet aircraft requirements.

**MEN:** A highly trained force of expert Metallurgists • Chemists • Designers • Engineers • Technicians • Production Craftsmen

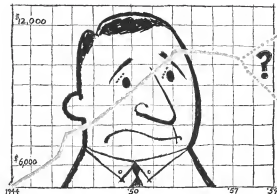
**MACHINES:** Millions of dollars worth of equipment for Machining • Heat Treating • Grinding • Assembling and inspecting bearings with micro-inch precision.

**THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS**

**HYATT** **HY-ROLL BEARINGS**  
**FOR AIRCRAFT INDUSTRY**







*The  
"career-curve"  
of a  
man named  
Carter*

Charlie Carter started out like a bell of fire. First two years — outside! Then he moved to slow down. Other men — younger newsmen — passed him by. Why?

What happened to Charlie? Nothing! It's what has been happening to industry. Business has become a tug and bury, it moves too fast for men who aren't satisfied with the same job. Never have management ranks been so wide open for "get up and go" men.

Look ahead, read ahead, get ahead. Know your job inside out. Be an "industry" man. Don't stop here. Be a growing man... equally knowing on the new current of other job functions within your company — well informed on the working relationship of all operations — the big picture.

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## NEW DOUGLAS DC-8 JETLINER

### EQUIPPED WITH MACWHYTE CONTROL CABLES



#### MACWHYTE WIRE ROPE COMPANY.

2312 Riverside Drive, Roswell, Georgia

Cable • Terminals • Assemblies • Tie Rods

Manufacturers of Liberty Lashers, Fiberglass Wire Ropes,

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San Francisco 1, 1500 1st St. • Los Angeles 32, 115 S. Main St.

Douglas' sleek new DC-8 packs four turbojet engines, cruises at speeds up to 580 MPH... and will cross the United States in just 4 hours, 33 minutes on regularly scheduled flights! These fine aircraft will soon be delivered to major airlines, including Pan American World Airways, who will use them to open the Pacific in 1959, hours and the Atlantic in 1960 hours.

Up to 176 passengers can enjoy the DC-8's comfort and quiet flying "over the weather" in one level atmosphere at altitudes up to 35,000 feet. With a wing span of 139'9" and a total length of 135'6", the DC-8 will carry a full payload 5000 miles non-stop.

Every inch of the DC-8 has been thoroughly tested, and every structural design parameter considered over 100 years of air service.

And every component was selected to give maximum service. Macwhythe aircraft cable is an important element in the DC-8's control system.

Macwhythe "Hi-Tensile" Aircraft Cable is made in a complete line of sizes and types. Macwhythe "Bolo-Link" Cable terminals of stainless steel are available loose or in complete assemblies ready for installation. Macwhythe Aircraft Cables, Terminals, and Assemblies meet the requirements of aircraft manufacturers, airlines, and military specifications. Aircraft Catalog A-3 free on request.

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We have built a substantial part of the Ground Support Equipment for Jupiter, Atlas and Thor—as well as the GSE for our own GAE-72, a new air-to-surface missile for Boeing's B-52. We've designed and built GSE for rocket, aircraft, and fastjet craft for 12 years...proved its reliability in thousands of actual test flights.

Whether it's a crash program or a long range project, a single piece of hardware is complete ground support system... we'll build it to your print and do the whole package from R&D through manufacturing.

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**MISSILE DIVISION**  
NORTH AMERICAN AVIATION, INC.



**AC Aircraft Spark Plugs** original equipment  
on NEW **Cessna 310** and **L-27A Light Twins!**



Plants shown derive AC type HSB (1) installed in GATW. Conducted a series

**\*\*World's Best Aircraft Spark Plugs!**

They took the lead off the sky when Gemini engineered the new 330 and the military version, L-37A. Only the finest materials, components and workmanship go into these "advanced design" planes. And, of course, these rigid specifications include factory installation of AC Spark Plugs.

AC: Aircraft Spark Plugs give longer service life with fewer unscheduled stopovers. They burn up fast to burn away fouling combustion deposits as soon as they form. AC's steel alloy longer lifespan of the efficient scavenging action. They deliver the high ionizing spark needed for peak performance and reliability. In addition to the Light Tens, Gamma specifies AC's S-88 for the entire 260 Series, including the luxurious Skyline®. The military L-19 uses the HSR-RT as original equipment.

You'll find AC Aircraft Spark Plug best for the planes you fly.



Aircraft Case starts with 12.4

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上海财经大学 会计学院

**2008/09 EE: Award Recipients** Alaska: Alvin K. Hildreth, Jr. New Jersey: Michael J. Sprague, Jr. Florida: Michael J. Hines, Jr. New Jersey: Albert J. George, **Minnesota:** Virginia C. Gieseler, (U.S. Park) Minnesota: Stephen J. Belsky, California: John A. Winkler, Colorado: Clifford J. Green, Ohio: Kenneth Green, Colorado: Linda A. Hines, New Jersey: Barbara A. Adams, Company: Brian J. Davis, Texas: Chris Davis, Nevada: David J. Givens, **Shawnee** **Award Recipient:** MA: William J. Krasinski, Pennsylvania: F.C. Minkler, Alaska: Ray Green, Award Supplier: Lutz Dittgen, Alaska: Miriam M. Mowatt, Minnesota: Timothy A. Newberry, East Texas: Michael H. Hensley, Minnesota: Virginia A. Schaefer, Virginia: (U.S.) Paula







Manufacturers freight into our racks, while another makes radio-controlled payloads landing. Soon, giant unmanned shuttle may carry freight to Europe and South America—in orbit. Thompson Products has the experience and skill to help design and build important components for such radical new spacecraft.

## Want to build a freight rocket?



**Thompson Products can help you handle the job**

One of these days, a far-sighted manufacturer may launch a rocket freight service, and ship a sky-full of profit.

This company could well turn to Thompson Products for aid in designing and building components for these big, freight-carrying missiles. Ever since the earliest days of flight, Thompson has displayed remarkable ingenuity in developing advanced aerospace products.

Today, Thompson applies precision-made parts occasionally for space-powered planes, but for all American jets. And Thompson scientists, designers and engineers have now turned their talents to guided missiles.

Thompson has blasted new trails not only in the sky, but on the ground (for the automotive business), in the ground (for agriculture), and even under the ground (for mining)—not to mention dozens of other industries.

If you're considering the development of an advanced new product, why not call the Thompson people and let them help you get it on the assembly line?

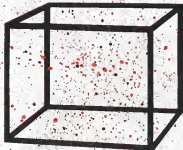
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From Thompson's 11 research centers and factories in 12 states, more, each year, important new advances in aeronautics, electronics, hydrodynamics, pneumatics, aerodynamics, thermodynamics and mechanics.

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## TENNEY packages any environment and delivers on time!

The often extreme field conditions your product will ever meet—deployed quickly in a turn-pipe, precise Tenney environmental testing chamber custom-built for the job! Strong, with one Tenney's expertly used chamber pre-recipe, it's right with you for engineering in a lightweight when test, in operation, actual environment conditions are achieved quickly.

Engineered efficiently throughout the test run, and accurate data is provided for quick, simple evaluation. For language describing Tenney's prototype chambers, or for recommendations on specific environmental testing problems, write to Tenney Engineering, the world's largest, most experienced creator of environmental testing equipment.



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ENGINEERING, INC.**

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PLANTS: BRUNN, N.J. AND BALTIMORE, MD. THERE IS A TENNEY CHAMBER TO SIMULATE ALTITUDE, HEAT, CRASH, HUMIDITY, VACUUM, EXPLOSION, SAND, DUST, FOG, AND MOST OTHER ENVIRONMENTAL CONDITIONS.



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# Plexiglas

...aviation's standard  
transparent plastic

Boeing 707's 39 windows are triple-glazed with PLEXIGLAS. Door and window panels are made of stretched PLEXIGLAS 35.

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Plexiglas is a trademark, Reg. U.S. Pat. Off. and is principal product of the Waters Corporation.

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at commercial prices

-then check on HUDSON...

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HUDSON provides quality metal components  
and produces by cost-reducing mass  
production methods. The HUDSON  
production department is equipped  
with facilities of standard and special  
pressure casting up to 700 tons.  
HUDSON performs a wide range of  
operations to meet your needs.

### 4. STANDARD PRECISION DRAWN INSTRUMENT CASES

Superior quality cases include over  
1400 different sizes with both  
brass and stainless steel. In air  
drawn quality, Hudson offers  
the engineer a range of choices  
unavailable in the industry.

### 3. MULTIPLE CLOSURES FROM 1/4" TO 24"

Cases  
and covers are offered by  
HUDSON from 1/4" to 24".  
Includes: instrument cabinet,  
brass large stock, injection. Cover  
equipment for 1/4" to 24" and  
fasteners also available.

### 2. SPECIAL FACILITIES FOR TRANSDUCER CLOSURES

HUDSON'S  
newly installed 12 station  
automatic division speed  
production on your transducer  
case. Closures for transducers,  
gages and other miniature  
components is available.

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HUDSON  
is now able to supply all metal  
components in standard sizes  
and shapes. Stock supply  
includes: stainless steel,  
brass, aluminum, copper,  
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HUDSON service is  
complete... includes sheet  
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HUDSON designers and  
production engineers will be happy to  
help work out your problems.



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Expert Fabrication in Steel, Stainless Steel, Aluminum, Brass, Copper and Mild Steel.  
Precision Metal Components for Gages, Meters, Machines, Analyzers and Testsets.





**ROCHESTER'S ONLY GAUGE TO STAND THIS TEST**—This photograph shows vibration testing of RMC-Lindsay pressure gauges in the 5000 foot rough G-force vibration in 30 G range, amplitude .015 in. 20 cps (3000 cycles per minute) for 200 hrs. The test is conducted on an 8000 lb. test cell and involves continuous, high speed vibration at 5000 ft/sec operating pressure. Double test results are available on request.

## THE RMC-LINDSAY GAUGE IS RADICALLY DIFFERENT from ordinary high pressure gauges

### HERE'S WHY...

1. The RMC-Lindsay gauge is a multiple seal, bellows hermetic type, resistant for overpressure.
2. The pointer is attached directly to the end of the coil, with no linkages or pivots to be affected by vibration.
3. Superior techniques in casting, heat treatment, calibration, and material specification are now and exclusive with RMC.
4. No other gauge can match RMC-Lindsay specifications.



**PERFORMANCE RECORD**—Proven in excess of 1,000 psi, up to 10,000 psi with actual tests available. OVERLOAD PROTECTION—Standard mechanical pressure limit of 2:1 times the maximum full scale (factor safety included). SHOCK PROTECTION—Survives 20 times the maximum full scale SHOCK/IMPACT—Not affected by temperatures up to 500°F. VIBRATION—Qualification test involves continuous sine wave shock testing vibration, to 5,000 cps at 20 G's and constant G-force vibration tests to 30 G's. BROKE—Data available on BROKE—TEST shock test. DELIVERING—Timeliness, confirmed by test schedules of 25% of the full full production. DELIVERING—To custom order or higher standards on customer's SPECIFICATIONS. Rochester Gauge and Instrument Co. is the only manufacturer of pressure gauges in the world.

Write to either plant, or contact one of the RMC representatives listed at right.

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LINDSAY PRESSURE GAUGES



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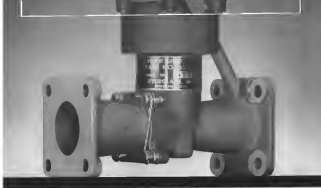
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## When pneumatic bleed calls for control...



Motor-operated Ret-Air Butterfly Valve



## the answer is right in this family

The featured player on this page is one of the latest additions to Hydro-Aire's family of pneumatic controller: a fast acting (less than a second) D.C. solenoid operated hot air shutoff valve. All dressed up in a precision casting (for low weight). It is ready to handle 300 psi at operating temperatures up to 300 degrees F. Because it is pilot operated, it's easy to convert direct, and it can be supplied to full and open or closed. Below...some of six distinguished colleagues. If you don't see the one for your requirement, let us know. We're always happy to add to this family.



**Producing Controls for Every Basic Airborne System**





POWER RECYCLED WATER VALVE  
HYDRAULIC



4-WAY SOLENOID SELECTION VALVE—HYDRAULIC



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CONTROLLABLE SHUT VALVE—HYDRAULIC



RESTRICTION AND CHECK VALVE



PILOT CHECK TAPS



REVERSE VALVE—HYDRAULIC OR PNEUMATIC



3-WAY SOLENOID SELECTION VALVE—PNEUMATIC OR HYDRAULIC



POWER BRAKE VALVE—HYDRAULIC OR PNEUMATIC



4-WAY SOLENOID SELECTION VALVE—PNEUMATIC



3-WAY SOLENOID SELECTION VALVE—PNEUMATIC OR HYDRAULIC

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### Call on Tactair for dependable hydraulic and pneumatic components

Does your job include the design or procurement of hydraulic and pneumatic components for aircraft or missile control systems?

If so, it will pay you to investigate the advantages of working with Tactair. Solving the unusual problems, meeting ultra-critical performance specifications, providing precision, high-pressure, high-temperature valves of the utmost dependability is our job. To do this requires a rare combination of creative engineering and specialized manufacturing skills. To these must be added precision equipment and long experience with weapons system components. Tactair has all these essentials.

A wide variety of Tactair valves and components are performing essential functions in today's aircraft and missiles. Typical components produced by Tactair include: solenoid selection, limiter controls, master brake cylinders, sequence valves, manual solenoids, controllable check, nonreturn and check valves. Tactair has also developed a servo supplier for the first completely pressure sensitive for business aircraft and is the sole producer of a commercial pressure-sense meter—a portable laboratory of indicating instruments that makes possible the flightlike testing of pilot and servo systems in aircraft.

We welcome the opportunity of meeting you with your next precision valve problem. Every job we do is done on a professional basis; it has been that way for 18 years. Tactair Valve Division, Aircraft Products Company, Bridgeport, Pa., EBroadway 5-1080.

CONTROL, SELECT, BRANE, RESTRICT, CHECK—

**TACTAIR®**

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## POWER FOR MISSILE & AIRCRAFT HYDRAULIC SYSTEMS



SHOWN ACTUAL SIZE

# Eastern HIGH SPEED GEAR PUMPS



Eastern Solenoid Hydraulic Pumps set new standards for performance, yet are the simplest, most lightweight ever made.

By meeting customer requirements and government specifications with precise detail, Eastern Pumps give reliable long-term service.

Headline models, close-coupled to electric motors with speeds to 24,000 RPM, can be furnished for your special system. You gain the advantage of economical mass-produced components custom-engineered into whatever configuration is needed. Performance is from 0.05 to 1.5 GPM, 0 to 3500 PSI, with theoretical displacements from 0.021 to 0.419 cubic inches per revolution. A variety of fitting combinations handle different types of fluid and operating pressures.

Missile and aircraft system engineers have discovered Eastern Pumps do the same job as units that use greater space and weigh far more. Applications have included: controlling cockpit in bomber guidance system, providing hydraulic power for ground control of jet, charging accumulator in air refueling system, furnishing an APU system with power to a missile, and countless others. For your next project, contact Eastern for creative engineering help that really helps.

Write for NEW Eastern Ruben 235 drawing the above units and latest company pump.

## EASTERN INDUSTRIES, INCORPORATED

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**SPS SELF-LOCKING NUTS**  
NUTS: 1007-1

All multi-headed SPS fasteners are available with Nylon lock polymer, internal nylon locking element, internal nylon polymer, internal nylon self-locking element, lock-washers, jam nuts, cone pins, and wires.



**PILLOWS LOCKING WASHERS**

Pill washers are more accurate than cones, washers, and are usually more reliable. Fasteners are installed properly when compressible washer ring is deformed to cover thickness of nut. One ring. All standard sizes.



**SPS PRESSURE PLATES**

Seal M<sub>2</sub> through M<sub>16</sub> ANPT Specification. Seal-Pin. High strength alloy steel, aluminum or, or aluminum. Provide a seal on nut and washer compound. Callous or seal plug. Minimum plug required.



**SPS SPECIAL DESIGN FASTENERS**

Above, special high-tensile alloy bolts offering tensile up to 340,000 psi. We can engineer to meet special screw, pin, nut, or bolt. In all cases, fasteners are made to meet your needs and alloy, including stainless.



**NYLON PIN SERIES INTERNAL WRENCHING BOLTS**

Size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast Specification. NAB 130. Made of special alloy steel, heat treated to 150,000-180,000 psi. Periodically formed by rolling after heat treatment.



**NYLON PIN SERIES EXTERNAL WRENCHING BOLTS**

Size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast alloy steel, heat treated to 150,000 psi. Periodically formed by rolling after heat treatment.



**FUSIBLE EXTERNAL WRENCHING LOCKNUTS**

At 170° F, size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast Specification. NAB 131 and others that apply. Aluminum alloy steel, formed by rolling after heat treatment. Approved for temperatures up to 330° F.



**SPS HIGH STRENGTH ALLOY STEEL FASTENERS**

At 170° F, size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast Specification. NAB 131 and others that apply. Aluminum alloy steel, formed by rolling after heat treatment. Approved for temperatures up to 330° F.



**FUSIBLE SELF-LOCKING NUTS**

AN-316, 316L, 316, Size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast Specification. NAB 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



**SELF-LOCK SPACING RINGS**

Size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast Specification. NAB 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



**FUSIBLE SELF-LOCKING NUTS WITH AN 31**

Size M<sub>2</sub>-28 through M<sub>16</sub>-12. Precast Specification. NAB 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473,



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| 1994 Hole Filling Compound    | Used to fill holes and on other parts of aircraft and missile components, especially in aluminum, nickel, titanium, etc. Compound with hardener. 200-5-145.  | Two-component, elastomeric, rubber-type compound. Cures by chemical reaction under all weather and temperature conditions. Good adhesion. Long-term durability. Does not shrink on weathering. Excellent "bite" and "grab".  |
| 1134 Filling Compound         | For use on light aircraft, especially in aluminum, nickel, titanium, etc. Compound with hardener. 200-5-146.   | Two-component, elastomeric, rubber-type compound. Cures by chemical reaction under all weather and temperature conditions. Good adhesion. Long-term durability. Does not shrink on weathering. Excellent "bite" and "grab".  |
| 1180 Sealant                  | Sealant for light aircraft, especially in aluminum, nickel, titanium, etc. Compound with hardener. 200-5-147.  | Two-component, elastomeric, rubber-type compound. Cures by chemical reaction under all weather and temperature conditions. Good adhesion. Long-term durability. Does not shrink on weathering. Excellent "bite" and "grab".  |
| 1134 Filling Compound         | For use on light aircraft, especially in aluminum, nickel, titanium, etc. Compound with hardener. 200-5-148.   | Two-component, elastomeric, rubber-type compound. Cures by chemical reaction under all weather and temperature conditions. Good adhesion. Long-term durability. Does not shrink on weathering. Excellent "bite" and "grab".  |
| 1170 Sealant                  | Sealant for light aircraft, especially in aluminum, nickel, titanium, etc. Compound with hardener. 200-5-149.  | Two-component, elastomeric, rubber-type compound. Cures by chemical reaction under all weather and temperature conditions. Good adhesion. Long-term durability. Does not shrink on weathering. Excellent "bite" and "grab".  |

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| 60131     | 3,600          | 3,600           | 1/2" NPT inlet and outlet                   | 34,000         |
| 60110C    | 3,500          | 2,500           | 1/2" NPT inlet and outlet                   | 16,000         |
| 60120C    | 3,600          | 3,600           | 1/2" NPT inlet and outlet                   | 15,000         |
| 60115     | 6,000          | 6,000           | 1/2" NPT inlet and outlet                   | 15,000         |
| 60125C    | 7,000          | 7,000           | 1/2" NPT inlet and outlet                   | 15,000         |
| 60124     | 5,000          | 5,000           | 1/2" NPT inlet and outlet                   | 30,000         |
| 6011A     | 10,000         | 10,000          | 1/2" NPT inlet and outlet                   | 30,000         |
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| 60110R    | 6,000          | 6,000           | For remote control only                     | 340,000        |
| 60110S    | 6,000          | 6,000           | For remote control only                     | 340,000        |
| 60120R    | 7,000          | 7,000           | 5 g.p.m. adjustable regulator with 1/2" NPT | 15,000         |
| 5818      | 3,600          | 1,600           | For remote control only                     | 200            |
| 18138R    | 7,000          | 7,000           | For remote control only                     | 100            |

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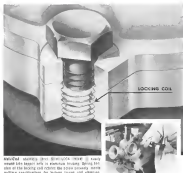
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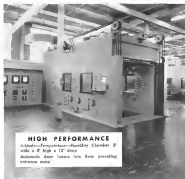


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